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10/065,260	09/30/2002	Hongyu Wang	120494-1	5667

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GENERAL ELECTRIC COMPANY  
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NISKAYUNA, NY 12309

EXAMINER

BAREFORD, KATHERINE A

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/065,260

Applicant(s)

WANG ET AL.

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 29 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28 is/are allowed.
- 6) ☒ Claim(s) 1-15 and 22-26 is/are rejected.
- 7) ☒ Claim(s) 16-21 and 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/02
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-28, drawn to a method for manufacturing an article, classified in class 427, subclass 454.
  - II. Claims 29-35, drawn to an article, classified in class 428, subclass 701.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process, such as chemical vapor deposition or physical vapor deposition rather than thermal spraying.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Paul DiConza on July 15, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-28. Affirmation

of this election must be made by applicant in replying to this Office action. Claims 29-35 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

#### *Claims*

6. In claim 4, line 2, should "cracks per inch" be "cracks per linear centimeter" as shown in parent claims 2 and 3?

#### *Claim Rejections - 35 USC § 102*

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, <sup>10</sup>~~13~~ 15, 22-23 and 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by McCluskey et al (US 5869146).

McCluskey teaches a method of manufacturing an article for use in a high temperature environment. Column 1, lines 10-50. A substrate is provided. Column 2, lines 10-20. A desired vertical crack density for a protective coating to be deposited on the substrate is selected (the desired density is zero, since no cracks are desired). Column 1, lines 10-20 and column 3, line 65 through column 4, line 10. A powder material is provided in a particle size distribution selected to provide a thermal spray coating having the desired vertical crack density. Column 3, line 65 through column 4, line 10 and column 4, lines 39-50. The powder material is applied to the substrate by thermal spraying to provide a coating having the desired vertical crack density. Column 6, lines 1-50.

Claims 2-4: the desired vertical crack density is selected at about zero cracks per linear cm (or inch), since no cracks are desired. Column 1, lines 10-50 and column 3, line 65 through column 4, line 10.

Claims 10-12: The substrate can be a material comprising silicon, such as a silicon containing ceramic of a fiber reinforced composite material. Column 2, lines 10-20 and column 6, lines 25-35.

Claim 13: the substrate can be a component of a gas turbine assembly. Column 1, lines 10-50.

Claim 14: the powder is a material capable of forming an environmental barrier layer to protect the substrate from a high temperature environment. Column 1, lines 10-50.

Claim 15: the powder can be a ceramic material. Column 1, lines 40-45 and column 2, lines 10-20.

Claim 22: the substrate can be heat treated after coating. See column 6, Table 1 "condition after heating above 2200 °F for 3 Hrs", and column 4, lines 45-50.

Claim 23: the substrate can be heat treated at about 1200 degrees C for three hours after coating. See column 6, Table 1 "condition after heating above 2200 °F for 3 Hrs", and column 4, lines 45-50.

Claim 25: the powder is a material capable of forming a thermal barrier layer to protect said substrate from a high temperature environment. Column 1, lines 10-50.

Claim 26: the powder is a ceramic. Column 1, lines 40-45 and column 2, lines 10-20.

*Claim Rejections - 35 USC § 103*

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 5-9 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCluskey et al (US 5869146)..

McCluskey, as described in the 35 USC 102(b) rejection above, teaches all the features of these claims except (1) the particle size distribution (claims 5-9) and the plasma spraying method (claim 24).

McCluskey does teach that the particle size range is preferred to <sup>be</sup> about 16 microns to about 176 microns, with an average of 62 microns. Column 4, lines 40-50. McCluskey further teaches that the precise particle range is dependent upon the plasma torch parameters, feedstock, particle stand off distance, and powder feed rate. See column 5, line 25 through column 6, line 2. McCluskey teaches that the particles are applied by plasma spraying. Column 3, lines 10-30.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCluskey to perform routine experimentation to optimize the range of particle distribution within the range of particle sizes claimed, because McCluskey teaches using an average particle size of 62 microns (in the range of the claimed 50<sup>th</sup> percentile) and that modification should be made within the particle range to be used based on features such as the plasma torch parameters, feedstock, particle stand off distance, and powder feed rate, thus teaching the desire to optimize the particle size range. It would further have been obvious to modify McCluskey to use air plasma spraying to perform the plasma spraying with an expectation of providing a desirable form of plasma spraying, because McCluskey teaches performing plasma

spraying with no limitation on the specific type of plasma spraying used, and it is the Examiner's position that it is well known in the thermal spraying art that air plasma spraying is a conventional form of plasma spraying.

12. Eaton et al (US 6254935) teaches applying a layer of barium strontium aluminosilicate to a silicon substrate by thermal spraying, where an intermediate layer can also be present, to provide a crack free coating. See column 2, lines 25-45 and column 4, lines 1-15. However, Eaton provides no particle sizes or size ranges for the material to be applied.

*Allowable Subject Matter*

13. Claim 28 is allowed.

14. Claims 16-21 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

✓ The cited prior art does not <sup>teach</sup> ~~teach~~ or suggest the use of the barium strontium aluminosilicate powder, the thickness of the applied coating, the intermediate layer, or the ceramic material of yttria stabilized zirconia.

*Conclusion*




Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:30-4:00) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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